provider equipment, which does not accurately measure from the customer's perspective. RMON probes use RMON standards to capture and define traffic information passing through a given point. The RMON standards are divided into nine groups for Internet and a tenth group for token ring. RMON 1 is geared towards collecting datalink layer (OSI layer 2) information. The information is organized based on MAC addresses and captures datalink information such as collisions, bad packets, and link utilization. The nine groups of RMON are statistics, history, events, alarms, hosts, matrix, topN, packet capture, and packet filter. The information is used for bandwidth allocation and for error detection.

RMON 2 is concerned more with application layer information. Statistics classify each passing frame as being unicast, broadcast or multicast. Totals are kept of the number of frames passed and the utilization of the link. Each frame is also categorized by size, from 64 bytes to 1518 bytes. In addition, bad frames are counted and summary totals are created. History takes a trend analysis of the statistics explained above and presents them in a graphical or spreadsheet form. This is usually captured in increments of 30 seconds worth of traffic or more. Hosts create a table of each MAC address sending data across the line and tabulates the number of frames, good and bad, unicast or broadcast, that each MAC sends. Matrix is similar to hosts but adds in destination MAC addresses as well. Then, statistics are summarized on a per-conversation basis between any two MAC addresses. Finally, topN takes host table information and correlates to the top number of MAC addresses. The N number is generally from 5 to 10 above. An example would be to correlate the top 5 MAC addresses as pertains to broadcasts or CRC errors.

There are individual tests that measure performance of specific user's activities. A WGET program measures the response times of Internet web surfing. Ping tests are well known to test throughput delays. Also, file transfer protocol tests measure getting and putting files from and to a web server. Unfortunately, these tests have not been effectively adapted to measure overall performance of a communication network from the customer's perspective, especially in a broadband wireless system.

Unfortunately, the current broadband wireless systems have not been effectively adapted to collect, store, and report performance information for the broadband wireless systems. The current systems typically focus on collecting, storing, and reporting fault information instead of performance information. Thus, broadband wireless system providers do not have an effective way to monitor system performance.

SUMMARY OF THE INVENTION

The invention solves the above problems by operating a performance management system. The performance management system generates and transmits a first instruction for a Remote Monitoring (RMON) probe to request RMON information. The performance management system receives and stores the RMON information in memory in the performance management system. The performance management system generates and transmits a second instruction for an RMON manager to request the RMON information. The performance management system receives and stores the RMON information in the memory in the performance management system. The performance management system generates and transmits a third instruction for an RMON database to request the RMON information. The performance management system receives and stores the RMON information in memory in the performance management system.

In some embodiments, the RMON information is datalink layer information, application layer information, a number of users, a number of bytes transmitted, download speed, or bits per second. In one embodiment, the RMON information is based on a media access control address.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a broadband wireless system in an example of the invention.

FIG. 2 is a block diagram of a national operations center in an example of the invention.

FIG. 3 is a block diagram of a regional aggregation point in an example of the invention.

FIG. 4 is a block diagram of a market hub in an example of the invention.

FIG. 5 is a block diagram of a head end in an example of the invention.

FIG. 6 is a block diagram of a customer premises in an example of the invention.

FIG. 7 is a block diagram of a performance management system in an example of the invention.

FIG. 8 is a block diagram of a customer premises with a sector probe in an example of the invention.

FIG. 9 is a flow chart for a sector probe in an example of the invention.

FIG. 10 is a flow chart for a sector probe with web surfing, file transfer protocol, and delay tests in an example of the invention.

FIG. 11 is a flow chart for a sector probe for a web surfing test in an example of the invention.

FIG. 12 is a flow chart for a sector probe for a bulk file transfer script in an example of the invention.

FIG. 13 is a flow chart for a sector probe for a ping test in an example of the invention.

FIG. 14 is a block diagram of a head end with a channel probe in an example of the invention.

FIG. 15 is a flow chart of a channel probe in an example of the invention.

FIG. 16 is a flow chart of a channel probe with state changes in an example of the invention.

FIG. 17 is a block diagram of a market hub with customer premises for sector probe management in an example of the invention.

FIG. 18 is a flow chart of a sector probe management system in an example of the invention.

FIG. 19 is a flow chart of a sector probe management system for active sector probes in an example of the invention.